Ann. Natal Mus. Vol. 25(2) Pages 501–510 Pietermaritzburg October, 1983

The genus Caffrowithius Beier, 1932, with the description of a new species from South Africa (Arachnida: Pseudoscorpiones)

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SYNOPSIS

Based on the redescription of *Chelifer concinnus* Tullgren (type species of *Caffrowithius* Beier), the genus *Plesiochernes* Vachon is synonymised with *Caffrowithius*. *Pselaphochernes natalensis* Beier (considered as synonym of *Caffrowithius concinnus*) is considered a good species of *Caffrowithius*. A new species, *Caffrowithius biseriatus* (De Hoop Cave, Cape Province) is described and figured. A key is supplied for the South African species of *Caffrowithius* Beier.

INTRODUCTION

While studying a small sample of pseudoscorpions from the De Hoop Cave, south-western Cape Province, which Miss Pamela A. Laycock (Rondebosch) had sent to me for identification, I became aware of difficulties in distinguishing the genera *Plesiochernes* Vachon and *Caffrowithius* Beier. A re-examination of the type specimens of *Chelifer concinnus* Tullgren (the type species of *Caffrowithius*) has led me to relegate *Plesiochernes* Vachon to the synonymy of *Caffrowithius* Beier. Furthermore an examination of the type specimen of *Pselaphochernes natalensis* Beier proved that this species had been incorrectly placed in the synonymy of *Caffrowithius concinnus* and must be considered a good species within this genus. A new species, *Caffrowithius biseriatus*, is described and figured.

Caffrowithius biseriatus sp. n. (Figs 12–20)

Description

Adult: Carapace and pedipalps reddish brown. Carapace 1,2–1,3 × as long as broad, densely granulate, regular granules separated by their diameter (mesozone), with two well-developed transverse furrows, the posterior furrow finely granulate at its base and one-third nearer to posterior margin of carapace than to median furrow; two indistinct eye-spots; setae of carapace and tergites short and clavate, 4 at anterior and 30 to 38 in metazone (approximately 16 at posterior margin); all tergites except last one divided, densely granulate (like carapace); half-tergites I–III with 9–11 setae at posterior margin, subsequent ones with 6–8; normally half-tergites IV–X (but also II–III) additionally with one lateral and one median marginal seta and mostly 3–6 discal setae, half-tergites clearly biseriate, tergite XI with 13–14 setae, two (in lateral position) being tactile setae (length 0,16–0,17 mm); lobe of pedipalpal coxa with 3 marginal and 1 discal setae, coxa of pedipalps 43–55 setae, coxa I 20–31, II 28–31, III 33–40, IV numerous setae; anterior genital operculum of ♀ with 24 semicircularly arranged setae, ♂ with 26–32; ♂ with usually 4 internal genital bristles; spermatheca of ♀ paired, mushroom-like (Fig. 19); sternites divided (except last one), half-sternite III 9–11 setae, spiracular plate with 3 bristles, half-sternite IV with 2–3 (♀) 7–8 (♂) setae respectively, spiracular plate with 1 bristle. Following half-sternites mostly 7–9 setae at posterior margin, one lateral and one median marginal seta and 5–8 discal setae, last sternite normally 12 setae (4 long tactile setae). Chelicera: 5 setae on palm (*db* denticulate near tip), fixed finger with 3–4 bigger and 2–3 granular teeth, movable finger with tooth-like subapical lobe, galea 6-branched, serrula externa 17–18 blades, flagellum with 3 dentate setae. Palps densely granulate (medially coarser than laterally), setae on femur clavate, on tibia and chela medially slightly clavate, laterally dentate. Trochanteral hump big, rounded, femur abruptly pedicellate, distally clearly tapering. Fixed finger with 38–43 marginal teeth, accessory teeth laterally 7–10, medially 3–4, movable finger with 43–49 marginal teeth, accessory teeth laterally 5–8, medially 2. Trichobothrial pattern as shown in Fig. 18a, *ist* clearly distad to *est*, *st* nearly always clearly nearer to *t* than to *sb*, in one ♂ halfway between them, nodus ramosus situated between *st* and *t*. In one ♂ trichobothrium *it* is lacking on left chela. Leg IV: tarsus with an acute tactile seta at beginning of last third (TS = 0,69–0,74), which is slightly longer than width of tarsus (length 0,09–0,11 mm). Claws simple.

Tritonymph: Carapace 1,3 × as long as broad, with 20 setae in metazone. Half-tergites I–III with 8 setae, subsequent ones with 5–6 setae at posterior margin and one lateral, one medial and 2–4 discal setae, last tergite with 11 setae (2 lateral tactile setae); pedipalpal coxa 28–29 setae, coxa I 12–15, II 17, III 18–20, IV 27, sternite II 5, half-sternites III–IV 4–6 setae at the posterior margin, 2 setae on anterior, one on posterior spiracular plate, subsequent half-sternites with 10–13 setae, two placed as lateral and medial marginal setae and some submarginally, last sternite with 11 setae (4 tactile ones). Chelicera: galea with 5 branches, serrula externa 16 blades. Trichobothria as shown in Fig. 18b. Fixed finger with 30 teeth, accessory teeth laterally 6, medially 2, movable finger with 35 teeth, accessory teeth laterally 5, medially one. Tarsus IV with tactile seta (TS = 0,65, length 0,09 mm).

Deutonymph: Carapace 1,3 × as long as broad, both transverse furrows smooth, 10 setae in metazone. Half-tergites with 5 setae, on half-tergites VII–X two placed anteriorly as lateral and medial marginal setae, on IX and X one is a discal seta, tergite XI with 9 setae (2 tactile setae); coxa of pedipalps 14–15 setae, coxa I–II 8–9, III 11–12, IV 12–13; half-sternites III with 1–2 setae, IV 2–3, one bristle on each spiracular plate, subsequent half-sternites with 5–6 setae, last sternite 6 (4 tactile setae). Chelicera: galea with 4 branches, serrula externa with 14 blades. Fixed finger with 27 teeth, distally one lateral and medial accessory tooth, movable finger with 29 teeth, accessory teeth wanting. Trichobothria as shown in Fig. 18c. Tarsus IV with tactile seta (TS = 0,57, length 0,06 mm).

Protonymph: Carapace 1,1 × as long as broad, no eye-spots, with 6–7 setae on posterior margin. Half-tergites with 3(–4) marginal setae, last tergite with 4 setae

TABLE 1

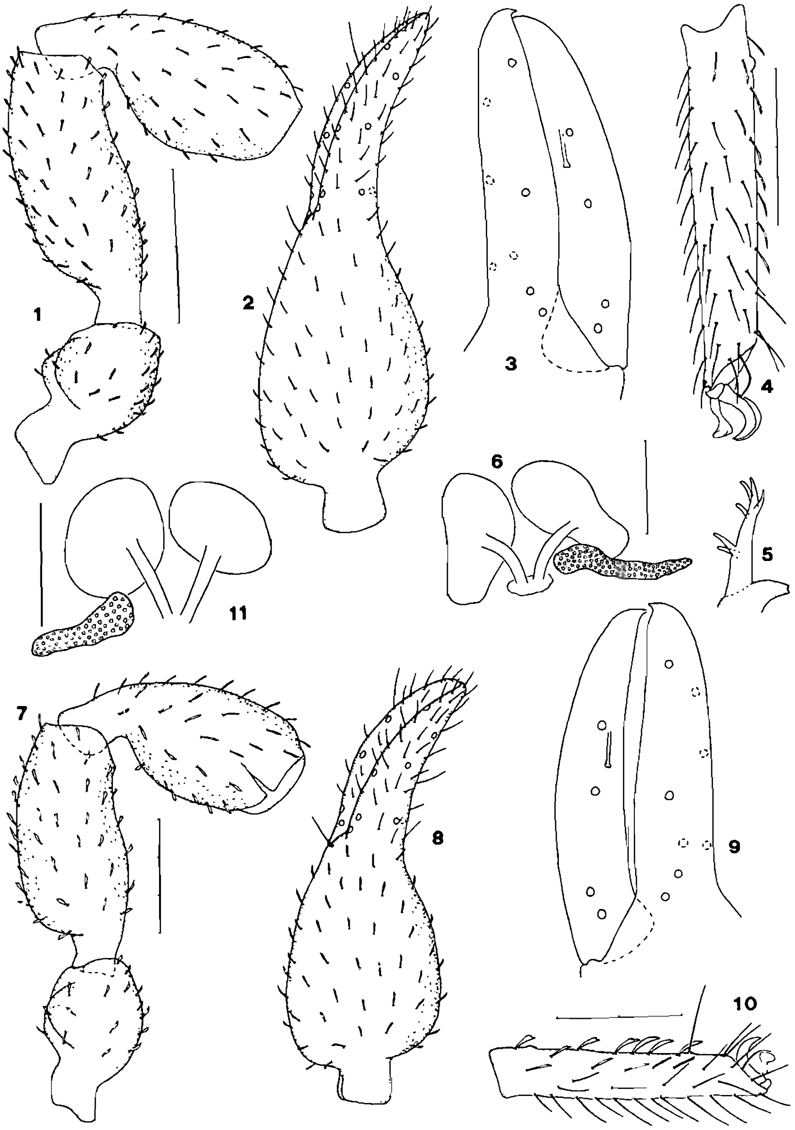
Range in measurements (mm) of various structures of all stages together with selected ratios of *Caffrowithius biseriatus* sp. n.

	Protonymph	Deutonymph	Tritonymph	Male	Female
Pedipalps:					
Total chela length	0,44	0,62	0.79	1,13–1.22	1,21
Chela length/breadth. ratio	3,1	2.9	3,0	3,2–3.3	3.0
Palm length (1)	0,26	0,34	0,44	0,66–0,73	0,74
breadth (2)	0,14	0,21	0.26	0,35–0,39	0,41
Finger length (3)	0,21	0,30	0.38	0,56–0,62	0,57
ratio 1/2	1.9	1.6	1,7	1.8–1,9	1.8
ratio 1/3	1.21	1,13	1.15	1,1–1.3	1.3
Tibia length (4)	0,22	0,31	0,41	0,65–0,73	0,70
breadth (5)	0.11	0.16	0,21	0.29–0.32	0.32
ratio 4/5	2,0	1,9	2.0	2,2–2,3	2.2
Femur length (6)	0,21	0,31	0,41	0,64–0,73	0,69
breadth (7)	0.10	0.15	0.19	0,26–0.30	0.29
ratio 6/7	2,1	2,0	2,2	2,3–2,6	2,4
Carapace, length	0,39	0.50	0,63	0,80–0.89	0,92
Leg I					
Basifemur length (a)	0.09	0,12	0,15	0,20–0.23	0,23
breadth (b)	0,06	0.08	0.11	0,13–0,15	0,15
ratio a/b	1.4	1,6	1.4	1.5–1.6	1,6
Telofemur length (c)	0.12	0,19	0.24	0.35–0,38	0,38
breadth (d)	0,03	0,07	0,10	0,12–0.13	0,15
ratio c/d	2,3	2,6	2.3	2,9–3,0	3,0
ratio c/a	1,34	1.52	1,56	1,63–1,75	1,65
Tibia length (e)	0,13	0.18	0,24	0,34–0,40	0,39
breadth (f)	0,05	0,06	0,07	0.08–0,09	0.09
ratio e/f	2,7	3.1	3,2	4,1–4,3	4,12
Tarsus length (g)	0,15	0.20	0,27	0,35–0,40	0,39
breadth (h)	0,04	0,05	0,06	0,06–0.07	0,07
ratio g/h	3,9	4.2	4,6	4,1–4,3	4,1
ratio e/g	0.84	0,92	0,88	5.4–6,1	5,8
Leg IV:					
Femur length (i)	0,24	0,34	0.46	0,63–0.70	0,70
breadth (j)	0,07	0,09	0,12	0,15–0,17	0,17
ratio i/j	3,3	3,8	3,7	3,9–4,3	4,2
Tibia length (k)	0,17	0.26	0,36	0,53–0,58	0,58
breadth (l)	0,06	0,07	0,09	0,10–0.11	0.11
ratio k/l	2.8	3,9	4.2	5.3–5,6	5.2
Tarsus length (m)	0,18	0,23	0,30	0,41–0,46	0,45
breadth (n)	0.04	0,05	0.06	0,07–0,08	0.08
ratio m/n	4,0	4.3	4,9	5.6–6,1	5,6
ratio k/m	0,95	1,13	1.22	1,26–1,38	1,30

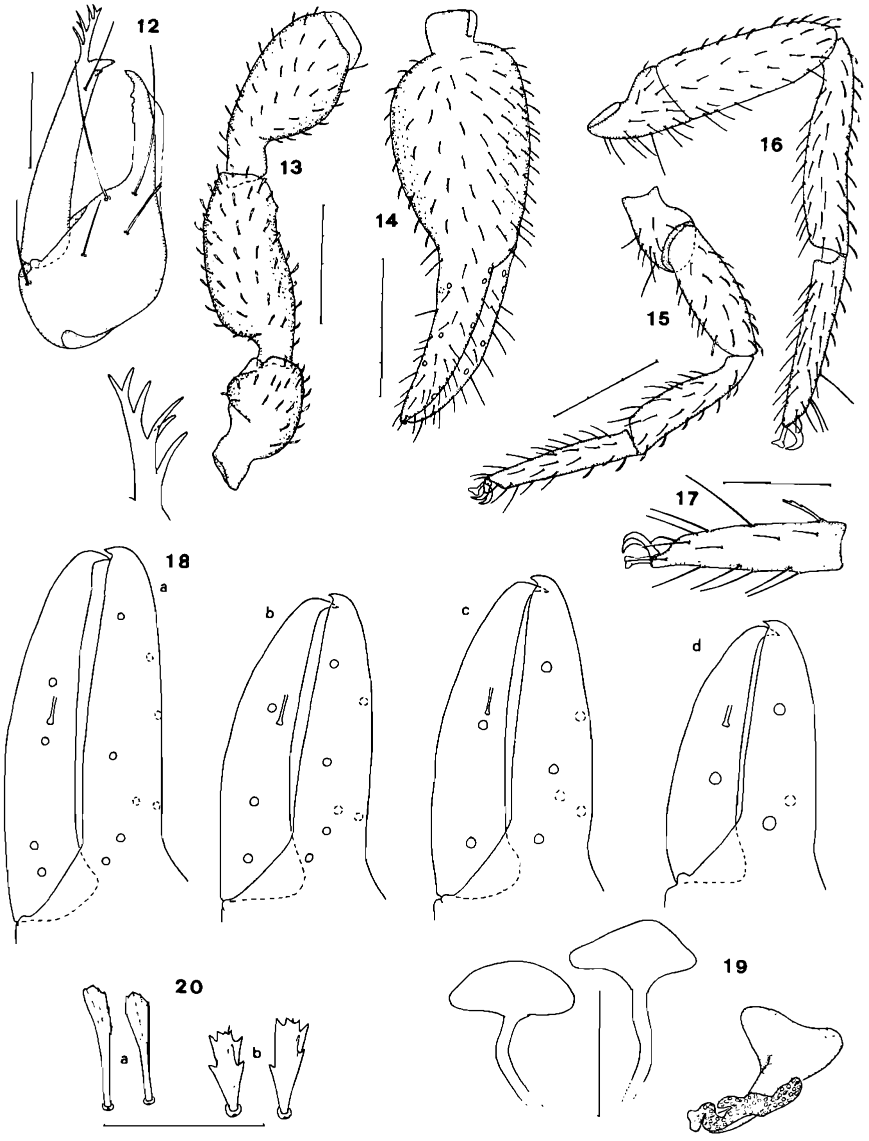
(2 tactile ones), lobe of palpal coxa with 3 setae (the external one is wanting), palpal coxa 4–5, coxa I 3–4, II 5–6, III 5–7, IV 5–6; half-sternite III one seta, IV 2, one bristle on each spiracular plate, subsequent half-sternites with 3 setae, last sternite with 4 tactile setae. Chelicera: palm with 4 setae (*db* is wanting), galea with 3 branches, serrula externa 11–13 blades. Fixed finger with 20, movable finger with 26 teeth, accessory teeth wanting. Trichobothria as shown in Fig. 18d. Tarsus IV with tactile seta (TS = 0,50, length 0,07 mm).

Material examined: SOUTH AFRICA, south-western Cape, De Hoop Cave, in bat guano, iv.1981, Pamela Laycock: 1 ♀ (holotype), 5 ♂, 1 trito-, 1 deuto-, 2 protonymphs (paratypes). Holotype and 6 paratypes in the Natal Museum (NM–2582), 3 ♂ paratypes in the Geneva Museum.

Caffrowithius biseriatus sp. n. belongs to the group of species with distinct discal setae on the tergites and is closely related to *C. natalensis*, sharing with that



Figs 1–11. *Caffrowithius* species. 1–6: *C. concinnus* (Tullgren), ♀-lectotype. 1–2: Pedipalps. 3: Trichobothrial pattern. 4: Tarsus IV. 5: Galea ♂. 6: Spermatheca ♀. 7–11: *C. natalensis* (Beier), ♀-type. 7–8: Pedipalps. 9: Trichobothrial pattern. 10: Tarsus IV. 11: Spermatheca. Scale unit 0,1 mm.



Figs 12–20. *Caffrowithius biseriatus* sp. n. 12: Chelicera ♀, with galea at higher magnification. 13–14: Pedipalps. 15: Leg I. 16: Leg IV. 17: Tarsus IV of protonymph. 18: Trichobothrial pattern of adult *(a)*, trito- *(b)*, deuto- *(c)* and protonymph *(d)*. 19: Spermatheca. 20: Setae of tergite X of *C. biseriatus* sp. n. *(a)* and *C. natalensis* (Beier) *(b)*. Scale unit 0,1 mm.

species the presence of long tactile setae on the last tergite and sternite and on tarsus IV, but is distinguished from it by a higher number of discal setae on tergites and sternites, apparently the shape of the spermatheca (the exact shape was not observable in *natalensis*) and a more slender tibia of leg IV. Furthermore, the tergal setae in *biseriatus* are clearly longer on the last tergites than on the first ones, of different shape and longer than those of *natalensis* (length of setae on tergite X: 0,073 mm and 0,057 mm respectively), only a few setae on the last sternites being dentate and slightly clavate in *biseriatus*, all being dentate and clavate in *natalensis*. From *C. lucifugus* (Beier) from Zaïre it may be distinguished by the shape of the palpal femur (more tapering distally), much longer tactile seta on tarsus IV and the granulation of the carapace (in *lucifugus* the granula are bigger and much closer to each other). Probably from the same cave ('De Hoop Vlei, 20 Miles NO von Bredasdorp, Guano-Höhle'), Beier (1955) mentioned specimens under *Pselaphochernes natalensis* which certainly belong to the new species.

SYNONYMY OF *PLESIOCHERNES* VACHON WITH *CAFFROWITHIUS* BEIER

Redescription of *Chelifer concinnus* Tullgren, 1907

Type specimens: 2 ♂ 11 ♀ from 'Botharville, Oranje Freistaat, H. Brauns, 9.x.1899' (Zool. Mus. Hamburg); one ♀ is designated as lectotype, the others as paralectotypes.

Carapace and pedipalps reddish brown, abdomen whitish. Carapace 1,1 × as long as broad, densely granulate, mesozonal granules slightly oval-shaped and separated by a half diameter, two well-developed broad transverse furrows (both finely granulate), posterior furrow slightly nearer to posterior margin of carapace than to median furrow. Two indistinct eye-spots. Setae of carapace and tergites short and clavate, 4 at anterior margin and 22 in metazone (arranged in two rows). All tergites except last one divided, densely granulate, half-tergites mostly with 4–7 setae at posterior margin, on II–X one lateral and one medial marginal seta and 2–5 (IV–X) submarginal and discal setae, tergite XI with 11–12 setae (two of them being short lateral tactile setae, length 0,07 mm, and four discal setae). Lobe of pedipalpal coxa with 3 marginal and 1 discal setae, pedipalpal coxa granulate, with approximately 34–38 setae, coxa I 20–22, II 24–31, III 33–42, IV numerous setae. Anterior genital operculum of ♀ with approximately 28 semicircularly arranged setae, ♂ with 38 long ones. Spermatheca of ♀ paired (Fig. 6). Sternites divided (except last one), half-sternite III with 10 (♂) and 5–7 (♀) setae respectively, IV 5–6 (♂) 3 (♀) resp., V–IX 6–9 setae at posterior margin, one lateral and one median marginal seta and 1–3 discal setae, X 4/1/1/0–1, last sternite with 8–10 setae (2 lateral tactile setae, length 0,09 mm, 4 discal setae). Chelicera: 5 setae on palm (*db* denticulate near tip), fixed finger with 3 big and 3 small teeth, movable finger with tooth-like subapical lobe, galea in both sexes with 6 branches, serrula externa 18 blades, flagellum 3 setae (at least first one dentate). Pedipalps densely granulate, setae on femur and tibia clavate, short lateral ones only slightly clavate on tibia, on chela medially slightly clavate, laterally dentate. Trochanteral humps big, femur abruptly pedicellate, distally slightly tapering. Fixed finger with 38–42 marginal teeth, accessory teeth laterally

10–17, medially 3–4, movable finger with 44–48 marginal teeth, accessory teeth laterally 12–16, medially 3–4. Trichobothrial pattern as shown in Fig. 3, *ist* normally distad of *est*, in a few cases nearly at same level, *est* only slightly nearer to *esb* than to *et*. Tarsus IV with a short smooth seta in distal third (TS = 0,71–0,73), which is shorter than width of article (length 0,05 mm); external setae clavate (slightly on tarsus).

Reasons for the proposed synonymy, and history of the genus *Caffrowithius* Beier

A comparison of *Plesiochernes* and *Caffrowithius* (based on the type species *concinnus* Tullgren and *elgonensis* Vachon respectively) shows them to be very similar. The following characters are shared by both taxa:

Spermatheca paired, showing a short basal duct and an enlarged apical portion. Smooth (tactile) seta on tarsus IV in distal third, short (not as long as width of tarsus). Carapace granulate, with two transverse furrows, flagellum of chelicera with three setae, palm of chelicera with 5 setae (normally *db* dentate), galea with 6 branches. Finger of chela with numerous accessory teeth, at least 2 of them being internal ones. Trichobothria: *ist* normally distad of *est, it* proximad of *et, st* halfway between *sb* and *t*.

The species *concinnus* shows a more distal position of *est* (nearly halfway between *esb* and *et* or only slightly nearer to *esb* than to *et*) (*elgonensis: est* clearly nearer to *esb* than to *et*) and more slender legs (*elgonensis*: femur IV 3,6–3,9, tibia 4,2–4,6, tarsus 4,9–5,2), but these differences are, in my opinion, of specific, and not generic, importance. There seems to be no doubt that the two taxa are congeneric, and so *Plesiochernes* has to be considered as junior subjective synonym of *Caffrowithius*.

Beier (1932*a*) erected the genus *Caffrowithius* for *concinnus* Tullgren within the cheliferid subfamily Withiinae, including also the species *Chelifer facetus* Tullgren, *Ch. subfoliosus* Ellingsen and *Ch. tumuliferus* Tullgren, this last species having been transferred to the genus *Cyrtowithius* Beier by Beier (1955). The generic allocation of *facetus* and *subfoliosus* cannot be verified, as the type specimens cannot be traced (Drs A. Holm, T. Kronestedt, M. Moritz, in litt.). The inclusion of *subfoliosus* in the genus is questionable. In his description, Ellingsen (1910) placed it within the *subruber* group (Withiinae) and compared it with *Ch. foliosus, cimicoides* (Chernetidae) and *perpusillus* (Withiinae), his statement, that accessory teeth are lacking, may be of importance. Furthermore the South African origin of this species ('Kapland', as indicated by Beier 1932*b*) seems to be very doubtful, being based on Ellingsen's record (1912). In his original description Ellingsen only indicated 'Africa' and as collector 'Conradt'. This collector had sent quite a lot of material (insects, amphibians, reptiles, etc.) to the Berlin Museum, all from Togo, Fernando Po, Cameroon and the Usambaras, but nothing (to my knowledge) from South Africa. Subsequently, three more species have been placed, or described, in *Caffrowithius: Pselaphochernes caffer* Beier, 1947, *Pselaphochernes natalensis* Beier, 1947, and *Caffrowithius procerus* Beier, 1966. The species *natalensis* has been erroneously considered a synonym of *concinnus* Tullgren (as indicated below). Incidentally, in Beier's (1966) paper some important accidental figure inversions must be mentioned: Fig. 1 represents *Paragonio-*

chernes digitulus (not *Calocheiridius rhodesiacus fuliginosus*), Fig. 6 *Calocheiridius rhodesiacus fuliginosus* (not *Caffrowithius procerus*), Fig. 7 *Caffrowithius procerus* (not *Paragoniochernes digitulus*).

Established synonymy of *Caffrowithius* Beier

Caffrowithius Beier, 1932 (*Zool. Anz.* **99**: 62; *Tierreich* **58**: 221) (Cheliferidae, transferred to Chernetidae by Beier 1964, *Ann. Natal. Mus.* **16**: 74).
Adelphochernes Beier, 1944 (*Eos, Madr.* **20**: 195).
Plesiochernes Vachon, 1945 (*Mission scient. Omo* **6** (57): 187, **syn. n.**
Anepsiochernes Beier, 1947 (*Eos, Madr.* **23**: 339; nom. nov. pro *Adelphochernes* Beier, 1944, nec *Adelphochernes* Beier, 1937, *Mitt. zool. Mus. Berlin* **22**: 271); synonymised with *Plesiochernes* Vachon by Beier 1955 (*Ark. Zool.* **7**: 554).

REVALIDATION OF *PSELAPHOCHERNES NATALENSIS* BEIER, 1947
(*Eos, Madr.*, **23**: 329, Fig. 34)

Beier (1947) described this species, based on one female, from Estcourt (Natal); subsequently it has been recorded from Cape Province (Beier 1955) and Natal (Beier 1958, complementary description). In 1964, Beier transferred it to the genus *Caffrowithius* and synonymised it with *concinnus* Tullgren. A re-examination of the type specimen (Brit. Mus. no. 09.11.24.6) shows clearly the validity of this species which is characterised as follows: Posterior margin of carapace with 28 setae (in two rows), half-tergites with 7–8 setae at posterior margin, one lateral, one medial marginal seta and 2–3 discal setae, last tergite with two long lateral tactile setae (length 0,16 mm). Spermatheca paired, apical portions enlarged. Half-sternites with 6 setae at the posterior margin, one lateral and one medial marginal seta and 4–6 discal setae, last sternite with 14 setae, four being lateral and medial tactile setae (length 0,16 mm); Cheliceral seta *db* apparently smooth. Palps clearly granulate. Both fingers with 41 marginal teeth, fixed finger with 7–9 lateral and 4 medial accessory teeth, movable finger with 7–8 lateral and 2 medial ones. Trichobothria as shown in Fig. 9. Tarsus IV with a long tactile seta (length 0,12 mm) in distal third (TS = 0,73).

TABLE 2

Measurements (in mm) of various structures and main ratios of the species *concinnus* Tullgren and *natalensis* Beier.

	concinnus ♂ ♀	*natalensis* ♀
Pedipalps		
Total chela length	1,30–1,47	1,16
Chela length/breadth (ratio)	3,0–3,2	2,9
Palm length (1)/breadth	0,76–0,82/0,43–0,46	0,69/0,41
ratio	1,7–1,8	1,7
Finger length (2)	0,63–0,69	0,52
ratio 1/2	1,18–1,23	1,33
Tibia length/breadth	0,72–0,80/0,32–0,34	0,67/0,30
ratio	2,2–2,5	2,2
Femur length/breadth	0,75–0,85/0,28–0,32	0,66/0,28
ratio	2,6–2,9	2,4
Carapace length	0,86–0,94	–
Leg IV		
Femur length/breadth	0,71–0,76/0,16–0,18	0,68/0,17
ratio	4,2–4,3	4,1
Tibia length(a)/breadth	0,58–0,65/0,11–0,12	0,53/0,11
ratio	5,3–5,8	4,7
Tarsus length(b)/breadth	0,47–0,49/0,08	0,46/0,08
ratio	5,9–6,2	5,8
ratio a/b	1,23–1,31	1,15

The species is easily distinguishable from *C. concinnus* by its smaller size, by the presence of long tactile setae on the last tergite and sternite and the presence of a long tactile seta on tarsus IV.

The South African species of the genus *Caffrowithius*, as defined here, may be identified using the following key; the species *facetus* Tullgren is tentatively included while *subfoliosus* Ellingsen is exlcuded.

1 Tarsus IV without a long tactile seta, an acute short seta may be present 4
– Tarsus IV with a long tactile seta, clearly longer than width of tarsus 2
2 Tactile seta in distal half of tarsus, palpal femur basally less abruptly enlarged, laterally nearly straight 3
– Tactile seta in proximal half of tarsus, palpal femur basally abruptly enlarged, laterally rounded .... **caffer** (Beier)
3 Half-tergites with 3–6, half-sternites with 5–8 discal setae, setae on last tergites long, dentate only in distal half; only a few dentate and clavate setae on last sternites; tibia of leg IV 5,2–5,6 times longer than broad **biseriatus** sp. n.
– Half-tergites with 2–3, half-sternites with 4–6 discal setae, setae on last tergites shorter, dentate also in their proximal half; all setae on last sternites dentate and clavate; tibia of leg IV 4,7 times longer than broad **natalensis** (Beier)
4 Chela stout, with pedicel at most 3,3 times longer than broad 5
– Chela slender, with pedicel 3,9 times longer than broad, femur 3,1 times longer than broad, length 0,62 mm .... **procerus** (Beier)
5 Small species, length of palpal femur 0,40–0,54 mm 6
– Larger species, length of palpal femur at least 0,62 mm 7
6 Palpal femur 2,3 times longer than broad, length 0,40 mm, tibia 2,1 times longer than broad, length 0,40 mm; trichobothrium *it* clearly nearer to *ist* than to *et*, forming a group with *est* and *ist* .... **natalicus** (Beier)
– Palpal femur 3,1 times longer than broad, length 0,54 mm, tibia 2,6 times longer than broad, length 0,52 mm; trichobothrium *it* half-way between *ist* and *it* (fide Beier 1932*b*) .... **facetus** (Tullgren)
7 Last tergite with two short tactile setae 8
– Last tergite without tactile setae, palpal femur 2,3 times (0,63 mm/0,27 mm), tibia 2,0 times (0,61/0,30 mm) longer than broad .... **bicolor** (Beier)
8 Palpal femur strongly swollen medially in basal half, 1,8 (♂) to 2,1 (♀) times, tibia 1,5 (♂) to 1,8 (♀) longer than broad, in male with a tooth-shaped protuberance medially .... **excellens** (Beier)
– Palpal femur of normal shape, 2,6–2,9 times, tibia 2,2–2,5, times longer than broad, without protuberances .... **concinnus** (Tullgren)

ACKNOWLEDGEMENTS

For the loan of type specimens I am indebted to Dr Gisela Rack (Zoologisches Museum, Hamburg) and Dr F. R. Wanless (British Museum (Natural History), London). I thank Drs A. Holm (Zoological Institute, Uppsala), T. Kronestedt (Zoological Museum, Stockholm) and M. Moritz (Zoologisches Museum, Berlin) for valuable information, and Miss Pamela A. Laycock for the opportunity of studying this interesting material.

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Date received: 12 March, 1982.